

**REMARKS**

The Final Office Action mailed January 12, 2004, has been received and reviewed. Claims 1 through 25 are currently pending in the application. Claims 13 through 25 have been withdrawn from consideration as being drawn to a non-elected invention. Claims 1 through 12 stand rejected. Applicant proposes to amend claims 1 and 2 and respectfully requests reconsideration of the application as proposed to be amended herein.

**Unity of Invention / Restriction**

The Examiner maintains the position that unity is lacking among the pending claims and has made this decision final. In doing so, the Examiner states there is no corresponding special technical feature shared by the claims, a “special technical feature” being a feature which defines a contribution over the prior art. The Examiner’s basis in stating that the claims lack a corresponding special technical feature is that claim 1 is currently rejected and, therefore, can not contain a “special technical feature” which may correspond with any of the other claims.

As set forth hereinbelow, Applicants submit that claim 1, as proposed to be amended herein, is allowable and, therefore, includes a special technical feature. Moreover, Applicants submit that claim 13 (currently withdrawn) includes corresponding special technical feature. As such, Applicants request that, upon allowance of claim 1, claims 13 through 25 likewise be allowed as including a corresponding special technical feature.

**35 U.S.C. § 102(b) Anticipation Rejections**

Anticipation Rejection Based on U.S. Patent No. 3,760,829 to Schuk et al. as Evidenced by U.S. Patent No. 3,732,164 to Pressley et al.

Claims 1, 2, 4 through 6, and 10 through 12 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Schuk et al. (U.S. Patent No. 3,760,829) as evidenced by

Pressley et al. (U.S. Patent No. 3,732,164). Applicant respectfully traverses this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Claim 1, as proposed to be amended herein, is directed to an apparatus for disinfection of waste water. The apparatus comprises: *an elongated passageway; at least two injection devices respectively located at spaced dosing locations along the passageway for introduction of a disinfectant to a stream of waste water flowing through the passageway; a source of disinfectant; a conduit arrangement extending between the disinfectant source and each of the dosing locations; and at least one flow control device positioned to regulate flow of disinfectant to each of the at least two injection devices through the conduit arrangement wherein the at least one flow control device is set to maintain a lesser regulated flow of disinfectant through each injection device than a regulated flow of disinfectant through an injection device located upstream therefrom.*

The Examiner cites Schuk as disclosing a system for disinfecting wastewater comprising a plurality of injectors spaced along a flow path in communication with a chlorine supply (the use of injectors being taught by Pressley and which is incorporated by reference into Schuk). The Examiner states that “the dosing of chlorine is controlled by respective valves 9 and 15 coupled to a control system (6,8,11,13,14),” the control system operating the valves in response to outputs from sensors (4, 5, and 12) and a flow meter (1). (See, Final Action, page 4). Additionally, the Examiner makes the following statement regarding the teachings of Schuk:

As for the limitation of the flow control device being configured to provide a lesser regulated flow of disinfectant through each injection device than a regulated flow of disinfectant through an injection device located upstream

therefrom, Schuk equation  $[(ABC)-F]*D=E$  (col. 5, line 65) governing the injection of the chlorine into the flow path demonstrates that such a configuration (structural capability) is inherent – the amount of chlorine injected via valve 9 is less than that injected via valve 15 (figure 2) when the additional chlorine E necessary to reach breakpoint is less than that originally added to adjust the pH(F).” (Final Action, page 4).

Applicants respectfully traverse this rejection.

Applicants note that Schuk discloses two alternative systems for controlling chlorine feed in a chlorine breakpoint chlorination process. The Examiner relies more particularly on the system shown and described with respect to FIG. 2 in rejecting claim 1 of the presently claimed invention. The Examiner places particular emphasis on Equation 11 (col. 5, line 65) as disclosing, inherently, that a flow control device is configured to provide a lesser regulated flow of disinfectant through each injection device than a regulated flow of disinfectant through an injection device located upstream therefrom. However, Applicants submit that Equation 11 fails to teach, either expressly or inherently, that the flow of chlorine through valve 9 is lesser than the flow of chlorine through valve 15.

With respect to Equation 11, Schuk states that “A” is the process flow rate (l/min), “B” is the  $\text{NH}_3 - \text{N}$  concentration (mg/l), “C” is the preselected  $\text{Cl}:\text{NH}_3 - \text{N}$  weight ratio, “D” is an error signal, “E” is the total chlorine dosage (g/min), and “F” is the amount of chlorine predose (g/min). Unfortunately, Schuk does not give exemplary values for enough of these variables to make a determination of what the value of “F” (chlorine predose) would be relative to the value of “E” (total chlorine) during typical operation of the system. Without such a comparison, Applicants submit that it is unreasonable to assume that Schuk inherently teaches any particular relationship regarding the flow rates of chlorine through valves 9 and 15 respectively.

Certainly Schuk fails to teach that a flow control device *is set to maintain* a lesser regulated flow of disinfectant through each injection device than a regulated flow of

disinfectant through an injection device located upstream therefrom. Indeed, Schuk teaches that a chlorine predose (through valve 5, and which is located upstream from the chlorine dosing through valve 9) is optional. For example, when introducing Equation 11, Schuk states the chlorine dosage is controlled by subtracting “the chlorine predose utilized for pH adjustment (*if any*) and [modifying] the approximate chlorine dosage to the optimum dosage required for complete removal of ammonia by breakpoint chlorination of a specific wastewater by means of an error signal.” (Col. 5, lines 57-62, emphasis added). In other words, in some instances, it is desirable that there be no chlorine predose, in which case the amount of chlorine introduced through valve 9 is clearly greater than the amount of chlorine (none) introduced through valve 15.

Additionally, Applicants submit that Schuk fails to teach an elongated passageway wherein at least two injection devices *are respectively located at spaced dosing locations along the passageway for introduction of a disinfectant to a stream of waste water flowing through the passageway*. Schuk shows a schematic of its system in FIG. 2, wherein the first injection device is positioned upstream of a first reactor (16) and the second injection device is positioned between the first reactor and second reactor (17). Applicants fail to find any teaching of a specific structural configuration of the reactors (16 and 17) or the associated connecting structures.

As such, Applicants submit that claim 1, as proposed to be amended herein, is clearly allowable over Schuk. Applicants further submit that claims 2, 4 through 6, and 10 through 12 are also allowable at least by virtue of their dependency from an allowable base claim.

Applicants respectfully request reconsideration and allowance of claims 1, 2, 4 through 6, and 10 through 12.

### 35 U.S.C. § 103(a) Obviousness Rejections

#### Obviousness Rejection Based on Japanese Patent No. JP 57-187090

Claims 1, 2, 4 through 7, 11, and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Patent No. JP 57-187090. Applicant respectfully traverses this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

The 35 U.S.C. § 103(a) obviousness rejections of the claims are improper because the references relied upon by the Examiner fail to teach or suggest all of the limitations of the presently claimed invention and because there is a lack of motivation to modify and/or combine the teachings of such references in the manner suggested by the Examiner.

Claim 1, as proposed to be amended herein, is directed to an apparatus for disinfection of waste water. The apparatus comprises: *an elongated passageway; at least two injection devices respectively located at spaced dosing locations along the passageway* for introduction of a disinfectant to a stream of waste water flowing through the passageway; a source of disinfectant; a conduit arrangement extending between the disinfectant source and each of the dosing locations; and at least one flow control device positioned to regulate flow of disinfectant to each of the at least two injection devices through the conduit arrangement wherein the at least one flow control device *is set to maintain a lesser regulated flow of disinfectant through each injection device than a regulated flow of disinfectant through an injection device located upstream therefrom.*

The Examiner cites the '090 patent as disclosing a system for disinfecting wastewater which includes a plurality of injectors (17-19) spaced along a flow path in communication with a chlorine supply 16, wherein the dosing of chlorine is controlled by respective valves coupled to a controller 14. The Examiner further cites the '090 patent as teaching that the control system operates the valves in response to outputs from sensors (e.g., 11-13 and 15) and that the system includes pretreatment in reservoir 1 and post treatment in reservoir 8. The Examiner states that, while '090 does not specifically teach the control/dosing system to be configured to decrease the dosed amount of chlorine for the second or third injection point, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have such a configuration depending upon the conditions of the raw wastewater inflow. Applicants respectfully traverse this rejection.

The '090 patent discloses injection of chlorine at a first location (19) into a conduit of influent fluid prior to the fluid's introduction into a trough portion of a tank which includes a settling basin (4). The second injection of chlorine is within a "water treating tank 5" which appears to also receive an overflow of supernatant liquid from the settling basin. The third injection of chlorine taught by the '090 patent occurs within a conduit connecting a filtration basin (6) and another tank (8, the function of which tank is not disclosed in the translated portion of the '090 patent). Thus, the '090 patent fails to teach or suggest an elongated passageway and at least two injection devices respectively located at spaced dosing locations along the passageway.

Moreover, the '090 patent fails to teach or suggest, in any manner, the amount of chlorine dosing that should take place at any of the three locations (17, 18 or 19). More particularly, the '090 patent fails to teach or suggest a flow control device which is set to *maintain a lesser regulated flow of disinfectant through each injection device than a regulated flow of disinfectant through an injection device located upstream therefrom.* Additionally, based on the limited description provided in the English translation of the '090 patent along with the schematic in FIG. 1, one of ordinary skill in the art would lack motivation to modify the system of the '090 patent in the manner suggested by the

Examiner since there is a lack of understanding regarding the specific operation of the system and its individual components.

As such, Applicants submit that claim 1 is clearly allowable over the '090 patent. Applicant further submits that claims 2, 4 through 7, 11 and 12 are also allowable at least by virtue of their dependency from an allowable base claim.

Applicants respectfully request reconsideration and allowance of claims 1, 2, 4 through 7, 11 and 12.

Obviousness Rejection Based on U.S. Patent No. 3,760,829 to Schuk et al. in View of U.S. Patent No. 4,997,574 to Sarunac

Claims 3 and 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schuk et al. (U.S. Patent No. 3,760,829) in view of Sarunac (U.S. Patent No. 4,997,574). Applicant respectfully traverses this rejection, as hereinafter set forth.

Each of claims 3 and 9 depend from independent claim 1. Claim 3 introduces the additional subject matter of the passageway being defined within a contact tank. Claim 9 introduces the additional subject matter of each injection device comprises a group of injectors fed by a single conduit of the conduit arrangement.

The Examiner relies on Schuk as applied to claim 1 hereinabove, and then relies on Sarunac as disclosing a plurality of injectors positioned along an elongated flow path within a contact tank.

As set forth hereinabove, Schuk fails to teach or suggest that a flow control device which is set to *maintain* a lesser regulated flow of disinfectant through each injection device than a regulated flow of disinfectant through an injection device located upstream therefrom. Applicants further submit that Sarunac fails to teach or suggest such subject matter.

Applicants, therefore, submit that claims 3 and 9 are allowable at least by virtue of their dependency from an allowable base claim and respectfully request reconsideration and allowance thereof.

Obviousness Rejection Based on U.S. Patent No. 3,760,829 to Schuk et al. in View of U.S. Patent No. 4,997,574 to Sarunac and in Further View of British Reference 1,263,916

Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Schuk et al. (U.S. Patent No. 3,760,829) in view of Sarunac (U.S. Patent No. 4,997,574), as applied above, and in further view of British Reference 1,263,916. Applicant respectfully traverses this rejection, as hereinafter set forth.

Claim 8 depends from independent claim 1 and introduces the additional subject matter of the dosing locations being spaced at substantially equal intervals. The Examiner relies on Schuk as applied to claim 1 hereinabove, and then cites Sarunac and the '916 patent as teaching the additional subject matter of claim 8.

As set forth hereinabove, Schuk fails to teach or suggest that a flow control device is set to *maintain* a lesser regulated flow of disinfectant through each injection device than a regulated flow of disinfectant through an injection device located upstream therefrom. Applicants further submit that Sarunac and the '916 patent fail to teach or suggest such subject matter.

Moreover, Applicants submit that the '916 patent teaches away from the presently claimed invention. For example, with reference to FIG. 3, the '916 patent states that "[q]uantities of slime-inhibiting substance are dispensed at metering points D1 to D4." ('916 reference, page 2, lines 120-122). The graph shown in FIG. 3, to which the above statement refers, indicates that the quantity of slime-inhibiting substance being introduced is equivalent at each dosing point (D1-D4). As such, Applicants submit that there is a lack of motivation to combine the references in the manner suggested by the Examiner.

Applicants, therefore, submit that claim 8 is allowable at least by virtue of their dependency from an allowable base claim and respectfully request reconsideration and allowance thereof.



### ENTRY OF AMENDMENTS

The proposed amendment to claims 1 and 2 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. Further, the amendments do not raise new issues or require a further search. Moreover, Applicants submit that the proposed amendment could not be entered earlier since the proposed amendment is in response to the new basis of rejection set forth by the Examiner regarding the interpretation of certain claim language.

Finally, if the Examiner determines that the amendments do not place the application in condition for allowance, entry is respectfully requested upon filing of a Notice of Appeal herein.

### CONCLUSION

Claims 1 through 12 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicant's undersigned attorney.

Respectfully submitted,



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